

TM 11-212-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

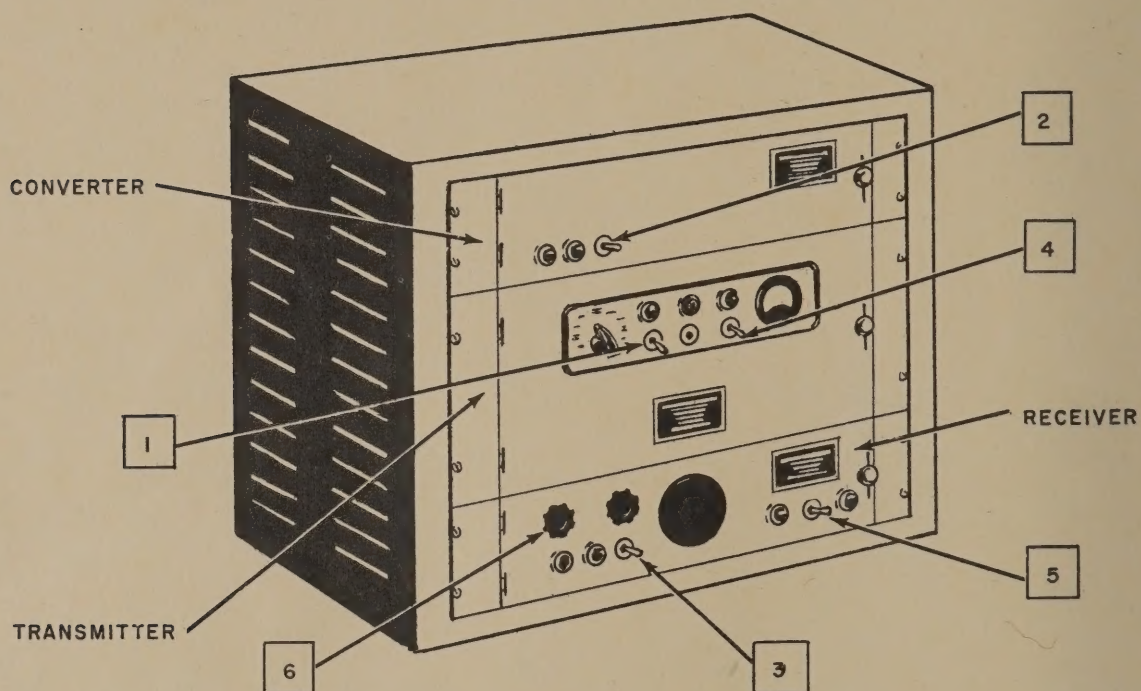
RADIO SET AN/TRC-47 OPERATORS MANUAL



HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1958

CONDENSED OPERATING INSTRUCTIONS FOR RADIO SET AN / TRC-47



TO OPERATE SET

a. The numbers of the steps (1 through 6) below correspond to the numbers of the controls on the diagram.

- (1) Throw the transmitter FIL ON-OFF switch to ON.
- (2) Throw the converter ON-OFF switch to ON.
- (3) Throw the receiver ON-OFF switch to ON.
- (4) Wait 5 minutes and throw the PLATE ON-OFF switch to ON.
- (5) Throw the SQUELCH-OPEN switch to the SQUELCH position.
- (6) Turn the SENSITIVITY control completely clockwise. With no signal being received, turn the SENSITIVITY control counterclockwise to the point where noise from the loudspeaker quiets.

TO TURN SET OFF

b. To turn the set off place all ON-OFF switches in the OFF position.

SAFETY SET ANTI-LOCK
OPERATION MANUAL

WARNING

Be careful not to contact high voltage connections or 115-volt input connections.

TECHNICAL MANUAL
No. 11-212-10

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 28 April 1958

RADIO SET AN/TRC-47 OPERATORS MANUAL

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* This manual supersedes so much of C1, 8 May 1956; C2, 2 July 1956; C3, 7 December 1956; and C4, 9 May 1957 to TM 11-221, 2 March 1956, as pertains to operating instructions for Radio Set AN/TRC-47.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual covers the installation, operation, and operator's maintenance of Radio Set AN/TRC-47 (fig. 2).

b. The appendix contains an operator maintenance repair parts and special tools list.

c. Official nomenclature followed by (*) is used to indicate all models of the equipment item covered in this manual. Thus, Radio Transmitter T-593(*)/TRC-47 represents Radio Transmitters T-593/TRC-47 and T-593A/TRC-47; Radio Receiver R-748(*)/TRC-47 represents Radio Receivers R-748/TRC-47 and R-748A/TRC-47.

d. Forward comments on this publication direct to Commanding Officer, United States Army Signal Publications Agency, Fort Monmouth, N. J.

2. Forms and Records

a. *Unsatisfactory Equipment Reports.* Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to Commanding Officer, United States Army Signal Equipment Support Agency, Fort Monmouth, N. J., as prescribed in AR 700-38.

b. *Damaged or Improper Shipment.* Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army); Navy Shipping Guide, Article 1850-4 (Navy); and AFR 71-4 (Air Force).

c. *Preventive Maintenance Form.* Prepare DA Form 11-238 (Maintenance Check List for Signal Equipment—Sound Equipment, Radio, Direction Finding, Radar, Carrier, Radiosonde, and Television) (figs. 14 and 15) in accordance with instructions on the form.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. Radio Set AN/TRC-47 is primarily used as part of a 3-mile, single-channel, radio link in a two-wire telephone system. A converter is used to connect the four-wire audio system of the radio link to the two-wire telephone circuit. A single Radio Set AN/TRC-47 comprises only one terminal of a radio link. Two radio sets (one at each end of the link) are required to form a complete radio system. A radio link, using Radio Sets AN/TRC-47, is used as an emergency substitute in case the normal land wire system fails and interrupts normal telephone communications. The radio sets are connected so that they parallel (fig. 1) the telephone system. Being capable of continuous operation, they are then kept in a standby condition (with power applied) for immediate use in case of failure of the telephone wires or cables. If such failure occurs, the radio sets are placed in operation to maintain communications.

b. The radio set provides line-of-sight duplex voice communication. Although it may be used on any two pre-aligned frequencies (one for the transmitter and one for the receiver) in the frequency range of 132 to 150 megacycles (mc) the radio set is

shipped from the manufacturer already alined to the proper operating frequency. Radio Set AN/TRC-47 is installed and operated in an electrical equipment cabinet provided with the set and is designed for operation with a minimum of operator attendance.

4. Technical Characteristics

a. <i>Radio Transmitter T-593(*)/TRC-47.</i>	
Transmitter type.....	Crystal-controlled, amplitude-modulated, very-high-frequency.
Input power requirements.....	115 or 230 volts, 50- to 400-cps ac, single-phase; 225 watts when transmitting, 115 watts on standby.
Power factor.....	90%.
Signal input requirements.....	20 db to +10 db from a 600-ohm balanced or unbalanced line.
Modulation capability.....	100% at full rated output.
Audio response.....	300 to 4,000 cps.
Frequency range.....	132 to 150 mc.
Crystal type.....	CR-18/U.
Crystal frequencies.....	7.4 to 8.4 mc.
Frequency stability.....	.005%.
Carrier power output.....	7 watts, continuous duty.
Output impedance.....	52 ohms, unbalanced.
Weight.....	47 lb.

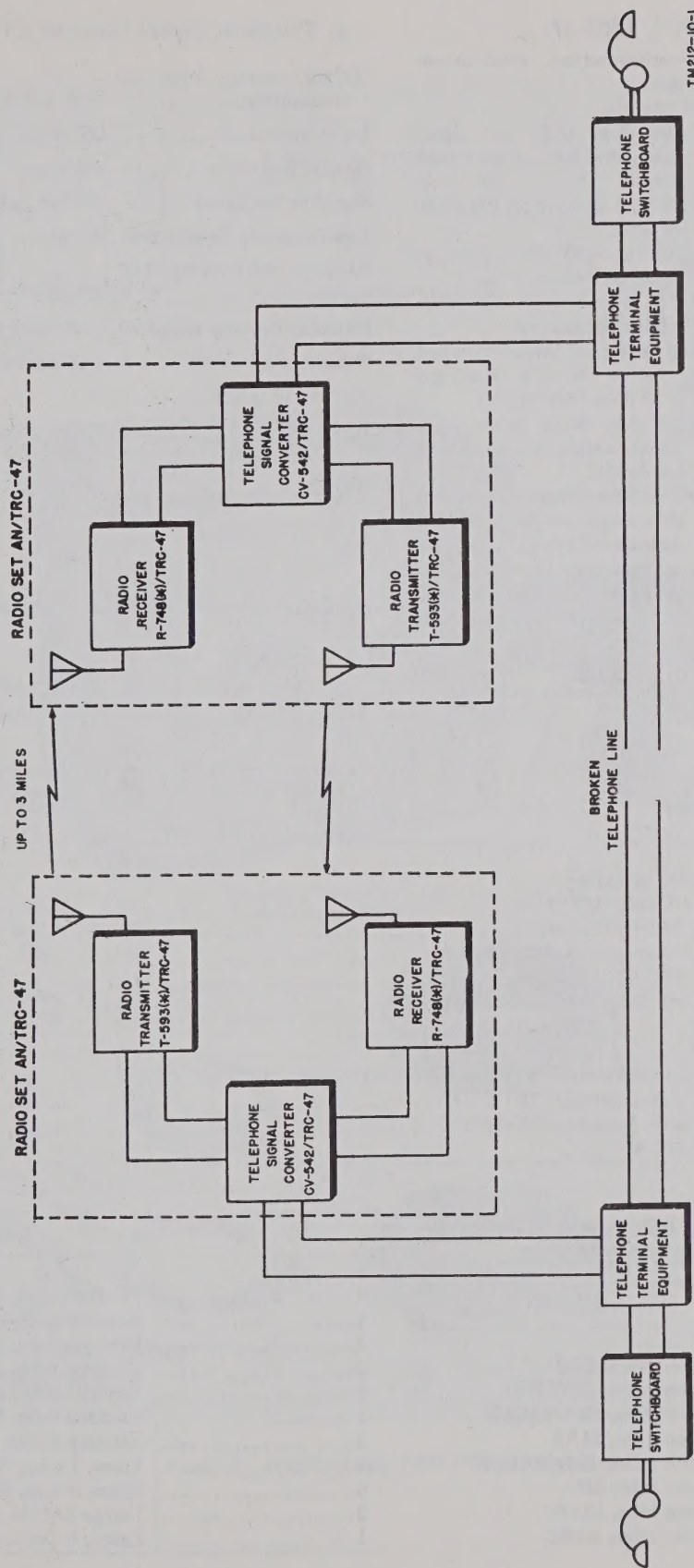


Figure 1. Radio set AN/TRC-47, system application.

b. Radio Receiver R-748(*)/TRC-47.

Receiver type.....	Superheterodyne, dual-conversion.
Type of modulation received.....	Amplitude.
Sensitivity.....	—100 dbm (2.28 μ v) signal modulated 30%, gives 1 watt output.
Selectivity.....	± 20 kc, 6 db down; ± 100 kc, 60 db down.
Signal-to-noise ratio.....	10 db for —100 dbm (2.28 μ v) signal modulated 30%.
Frequency range.....	132 to 150 mc.
Input impedance.....	52 ohms, unbalanced.
AGC action.....	1 db maximum output variation between —95 dbm (4 μ v) and —20 dbm (22,000 μ v).
Spurious response.....	More than 80 db below those signals within the selectivity bandwidth.
Audio response.....	± 2 db with respect to 1,000 cps over range 200 to 3,000 cps. At least —20 db at 10,000 cps.
Distortion.....	Less than 8% from receiving 30% modulated signal of —50 dbm power, in audio output of 1 watt.
Input power.....	120 volt-amperes, 115 or 230 volts, 50 to 400 cycles, ac.
Weight.....	30 lb.

c. Telephone Signal Converter CV-542/TRC-47.

Hybrid output level to transmitter.....	—33 ± 2 dbm.
Input impedance.....	600 ohms.
Output impedance.....	600 ohms.
Signaling frequency.....	800 cps $\pm .05\%$.
Low-frequency signal input.....	20 cps.
20-cps output level into 600 ohms.....	25 volts.
Signaling detector sensitivity.....	—20 dbm to +10 dbm.
Telephone line level.....	—20 dbm to —16 dbm.
Number of tubes.....	11.
Input power.....	72 volt-amperes, 115 or 230 volts, 50 to 400 cps.
Weight.....	23 lb.

5. Components of Radio Set AN/TRC-47

(fig. 2)

a. *Components.* The components of Radio Set AN/TRC-47 are listed in the following table:

Quantity	Item	Height (in.)	Depth (in.)	Length (in.)	Unit weight (lb)
1	Radio Set AN/TRC-47 including:				
1	Radio Transmitter T-593(*)/TRC-47.....	8 $\frac{3}{4}$	14 $\frac{1}{2}$	19	47
1	Radio Receiver R-748(*)/TRC-47.....	5 $\frac{1}{4}$	13 $\frac{3}{8}$	19	30
1	Telephone Signal Converter CV-542/TRC-47.....	5 $\frac{1}{4}$	13 $\frac{1}{4}$	19	23
2	Antenna AS-813/TRC-47.....				48
1	Electrical Equipment Cabinet CY-2126/TRC-47.....	21 $\frac{1}{4}$	14 $\frac{3}{4}$	22 $\frac{1}{2}$	27
4	Cord CG-122A/U.....			50 ft	5 $\frac{1}{4}$
2	Cord CG-55B/U.....			150 ft	16
1	Electrical Special Purpose Branched Cable Assembly CX-4065/TRC-47.....			25 $\frac{1}{4}$	
1	Electrical Power Cable Assembly CX-3743/U (6 ft).....			6 ft	
2	Electrical Power Cable Assembly CX-3743/U (3 ft).....			3 ft	
1 set	Running spares (b below).				

b. *Running Spares.* The following running spares are supplied with Radio Set AN/TRC-47:

Quantity	Item
2.....	Electron tubes, OB2
3.....	Electron tubes, 12AT7WA
1.....	Electron tube, 6005/6AQ5W
1.....	Electron tube, 6AX5
2.....	Electron tubes, 5654/6AK5W
1.....	Electron tube, 6J6
1.....	Electron tube, 12AU7
2.....	Electron tubes, 6AK6

Quantity	Item
1.....	Electron tube, 5763
1.....	Electron tube, 2E26
1.....	Electron tube, 5R4GY
2.....	Electron tubes, OA2
1.....	Electron tube, 6L6WGB
1.....	Electron tube, 5725/6AS6W
2.....	Electron tubes, 6X4W
12.....	Fuses, 1 amp, 250 v, Slo Blo
6.....	Fuses, 2 amp, 250 v, Slo Blo
3.....	Lamps LM-52
1.....	Lamp, 6 watts, 120 v



Figure 2. Radio set AN/TRC-47, less spare parts.

6. Nomenclature and Common Name

A list of the nomenclature assignments for the components of Radio Set AN/TRC-47 is given below. A common name is indicated after each item.

Nomenclature	Common name
Radio Set AN/TRC-47-----	Radio set.
Radio Transmitter T-593(*)/TRC-47.	Transmitter.
Radio Receiver R-748(*)/TRC-47--	Receiver.
Telephone Signal Converter CV-542/TRC-47.	Converter.
Antenna AS-813/TRC-47-----	Antenna.
Electrical Equipment Cabinet CY-2126/TRC-47.	Equipment cabinet.
Cord CG-122A/U (50 ft)-----	Extension antenna cable.
Cord CG-55B/U-----	Antenna cable.
Electrical Special Purpose Branched Cable Assembly CX-4065/TRC-47.	Audio cable.
Electrical Power Cable Assembly CX-3743/U (6 ft).	Converter power cable.
Electrical Power Cable Assembly CX-3743/U (3 ft).	Transmitter power cable or receiver power cable.

7. Description of Radio Set AN/TRC-47

(fig. 2)

a. Radio Set AN/TRC-47 operates in the frequency range of 132 to 150 mc. It is shipped from the manufacturer already alined to the proper operating frequency. The radio set contains no provisions for continuous tuning; therefore, any changes in operating frequencies requires the individual adjustment of various tuned circuits. Two corner-reflector-type antennas supplied with each radio set allow full duplex operation. All antenna and interconnecting cables required for operation are supplied with the radio set.

b. The radio set contains three separate chassis: a receiver, a transmitter, and a converter. Each of these components contains its own power supply and functions independently. The three units, which do not have individual dust covers or housings, are mounted one on top of the other in a dark gray, steel, equipment cabinet. Each component is mounted by means of two machine screws on each of the left and right edges of their front panels. When mounted, the front panels of the components form the front of the equipment cabinet. These front panels are hinged on the left and may be

opened as doors to reach the parts and connections behind each panel. The doors are spring-loaded so that they automatically close when opened less than halfway or fully open automatically when opened more than halfway. A removable panel forms the entire rear wall of the equipment cabinet so that all tubes and the rear of the components can be reached. The sides of the equipment cabinet contain louvers so that air may circulate freely around the components mounted within. The dimensions of the equipment cabinet (and therefore of the installed radio set) are 22½ inches wide, 21¼ inches high, and 14¾ inches deep.

8. Description of Radio Transmitter T-593(*)/TRC-47

(fig. 3)

a. The transmitter, its modulator, and power supply, which contain a total of 10 electron tubes, are mounted on a common chassis. This chassis is vertically connected to a front panel by which the entire unit is rack-mounted in the equipment cabinet (par. 7). Therefore, all tubes and components lie in a horizontal plane. A subpanel that contains all operating controls and the tuning meter is mounted behind the front panel. This subpanel can be seen and reached through a rectangular cutout in the front panel door. The door may be opened to reach all tuning adjustment controls. The subpanel is not attached to the door, and when the door is opened the subpanel remains in its original position. The subpanel, however, is hinged at its left side, and when a machine screw is removed from the right edge of the subpanel it also may be opened like a door. This exposes the rear of the meter and the controls that are mounted on the panel. A microphone jack, included on the panel, is not used with Radio Set AN/TRC-47.

b. A perforated aluminum shield attached by two machine screws completely incloses the rear of the radio-frequency (rf) assembly. This shield may be removed for servicing. The entire rf assembly is mounted on a subchassis that may be removed as a unit, from the main chassis, for servicing.

9. Description of Radio Receiver R-748(*)/TRC-47

(fig. 4)

The receiver contains 14 electron tubes and is mounted on a single chassis which is vertically mounted to a front panel. All tubes and components lie in a horizontal plane when the receiver is mounted in the equipment cabinet. The entire

center portion of the front panel forms a door that may be opened to reach the tuning controls and the receiving tubes in the rear. All operating controls and a loudspeaker are mounted on the door and swing with the door when it is opened. The loudspeaker is mounted behind a circular cutout in the door and is protected by a perforated metal grill which covers the opening.

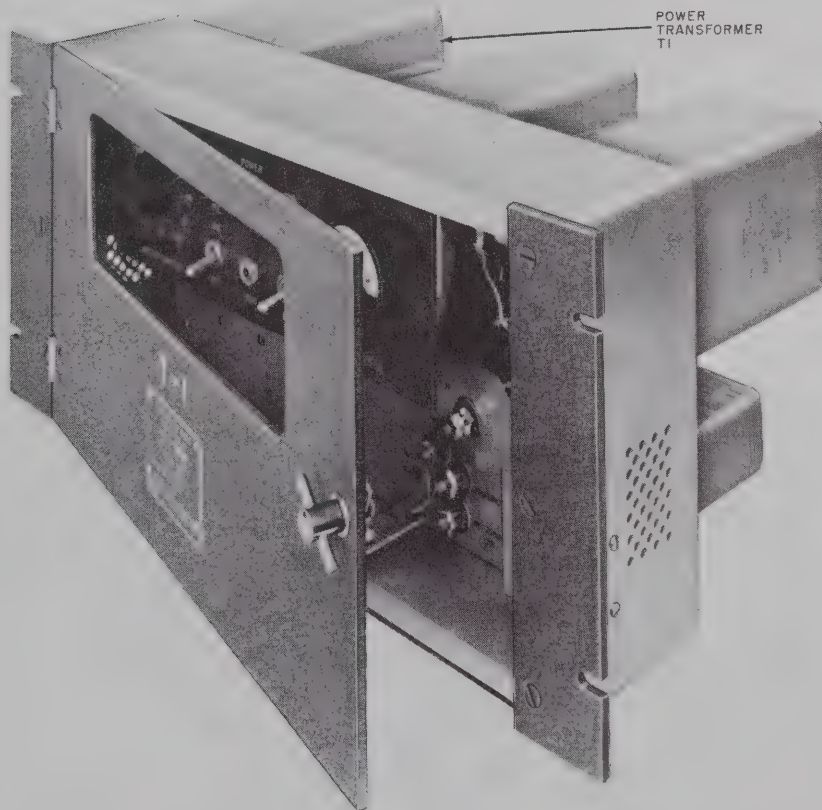
10. Description of Telephone Signal Converter CV-542/TRC-47

(fig. 5)

a. The converter is a combined ringing signal converter and electronic hybrid network. The ringing signal converter circuits convert a 20-cycle-per-second (cps) ringing signal from the local tele-

phone line to an 800-cps ringing signal capable of being transmitted by radio. They also convert any 800-cps ringing signal received from the receiver to a 20-cps ringing signal for the telephone lines. The hybrid network provides terminal facilities that interconnect the four-wire radio system (two wires for incoming audio and two wires for outgoing audio) with the two-wire telephone system (both incoming and outgoing audio carried by the same two wires).

b. The converter is mounted on a single chassis and is vertically connected to a front panel. The front panel contains a door upon which the operating controls are mounted and which opens so that the bottom of the converter chassis can be reached.



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Figure 3. Radio transmitter T-593(*)/TRC-47.

11. Description of Antenna AS-813/TRC-47 (fig. 2)

Two corner-reflector, ground-plane type antennas of 50 ohms impedance are supplied with each radio set. These antennas operate in the frequency range of 132 to 150 mc and direct radiation along a narrow beam. A single driven element is vertically mounted in the center of a triangularly shaped base that serves as the counterpoise (ground-plane). The base is made of a perforated aluminum plate supported by an aluminum framework. The triangular base is 65 inches on two sides with the third side (or front) being approximately 89 inches long. The driven element is adjustable in length (from 17 to $21\frac{3}{4}$ inches) and position. The bottom of the element is fitted for connection to a coaxial line. The two sides of the corner reflector are formed of 16 vertically mounted $\frac{3}{8}$ -inch diameter rods, each of which is 42 inches long. The entire unit can be mounted on a pole or mast by two chain-type pole clamps and two supporting legs.

12. Description of Minor Components

The components supplied with the radio set in addition to the major components are the required connecting cables (fig. 2). Cords CG-55B/U and Cords CG-122A/U are used to connect the antennas with the radio set. Cords CG-55B/U (150 feet) are the primary antenna cables and Cords CG-122A/U

(50 feet) are used as extensions when the primary antenna cables are not long enough for the particular installation. Electrical Special Purpose Branched Cable Assembly CX-4065/TRC-47 is used to interconnect the audio signals between the converter, transmitter, and receiver. One end of the cable, terminated in a 5-contact connector, plugs into the converter. The cable branches into two parts at approximately the midpoint of its length. The wires that are to be connected to the transmitter are terminated in a 10-contact connector; those to be connected to the receiver are terminated in a 12-contact connector.

13. Additional Equipment Required

For normal operation of the radio set (that is, working into a telephone system), additional equipment is not required. However, if the radio set is to be modulated by the operator, a field telephone set must be connected to the telephone line terminals at the rear of the converter. A field telephone set is not supplied with the radio set and must be requisitioned separately.

14. Differences in Models

The unlettered and A models of the receiver and transmitter are identical in circuitry and operation. The unlettered models, however, contain commercial components and the A models contain Jan-standard components.

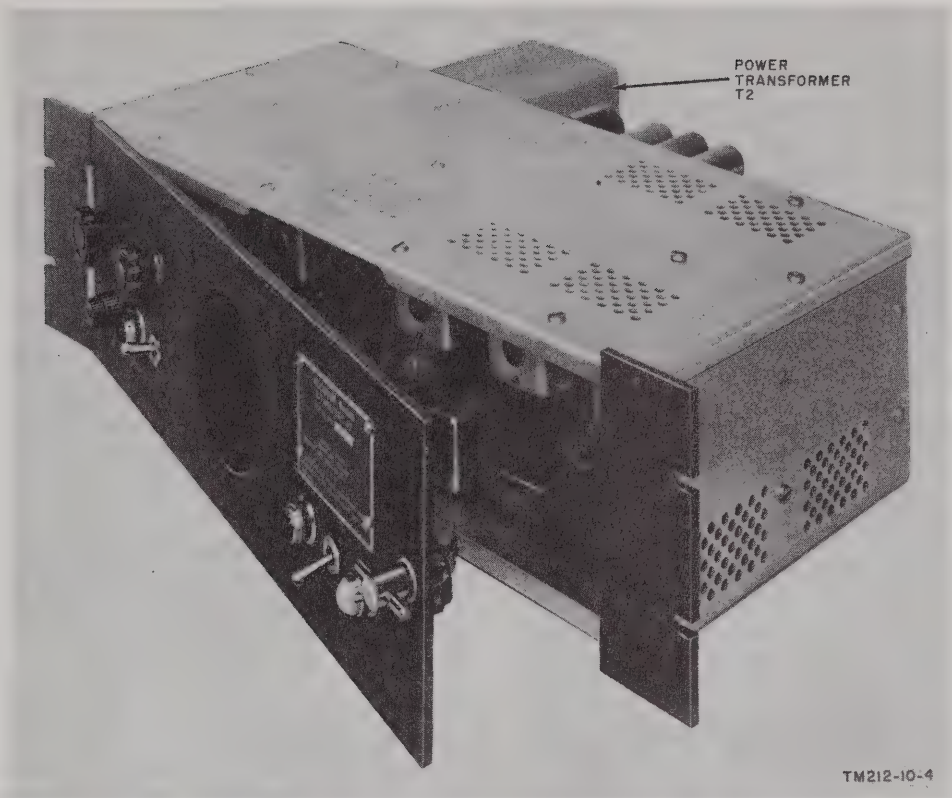


Figure 4. Radio receiver R-748(*)/TRC-47.

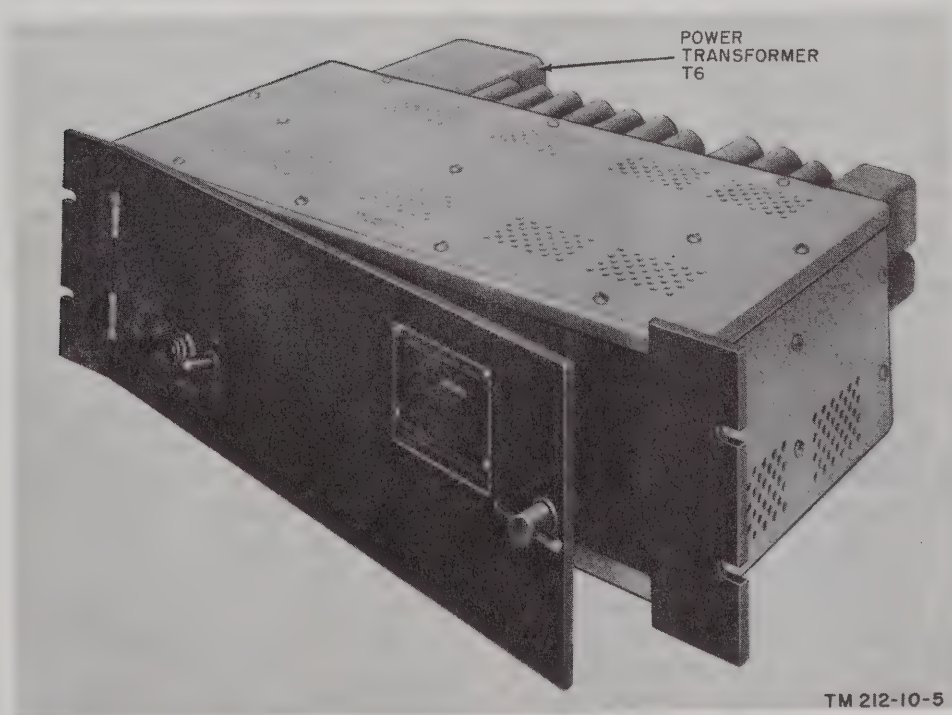


Figure 5. Telephone signal converter CV-542/TRC-47.

CHAPTER 2

INSTALLATION

15. Unpacking

(fig. 6)

a. Packaging Data.

- (1) All components of Radio Set AN/TRC-47 are cushioned and packaged within individual water-resistant fiberboard cartons. These cartons are sealed with waterproof

tape. The individually packaged components are packed in three wooden boxes. Each box is reinforced with flat steel strapping.

- (2) When packed for shipment, the components of the radio set are placed in wooden boxes as follows:

Box No.	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Unit weight (lb)	Contents
1 of 3	31½	20	24	8.6	161	Transmitter, receiver, converter, and power cables.
2 of 3	25	19	27	7.4	110	Equipment cabinet, antenna cables, audio cable, and spare parts.
3 of 3	9	47	93	22	130	Antennas.

b. *Removing Contents.* Unpack each box as follows:

- (1) Use a pair of metal shears and cut the steel strapping just below the box cover. Do not attempt to pry off the straps; the equipment may be damaged.
- (2) Use a nail puller and remove the nails from the box cover. Remove the cover.
- (3) Carefully remove each fiberboard packaged component from the box.
- (4) Cut through three of the upper edges of each fiberboard carton. The uncut edge on each carton will act as a hinge for the top cover of the carton. Open the top of each carton and remove the components.
- (5) Be sure to remove the power cables from the side fillers in the transmitter, receiver, and converter cartons before discarding the filler material.

b. The components of the radio set are shipped with all tubes, fuses, and crystals installed. Check the seating of the tubes and crystals in their sockets and the condition of all fuses. Any of these parts that are damaged should be replaced with spares.

- (1) *Tubes and crystals.* Part of the tube complement of each component can be reached from the rear of the component chassis. The rest of the receiver and converter tubes and the receiver crystal can be reached by opening the front panel door on each component. On the transmitter, in addition to opening the front panel door, an rf shielding cage at the rear of the chassis must be removed to expose five tubes and a crystal. To take off the cage, remove the two machine screws at its rear and pull the cage outward from the chassis.
- (2) *Fuses.* Be sure that the proper value fuse is inserted in the fuse holder of each component. The following chart shows the proper value of each fuse and references a figure that shows its location.

16. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. Inspect for such damage as broken tubes, broken glass on the transmitter meter, severely kinked or cut cables, bent front panels, bent antenna ground plane or reflector rods, damaged insulator on the antenna radiator element, and dented or bent equipment cabinet. If the equipment has been damaged, refer to paragraph 2

Component	Fuse symbol	Rating (amp)	Reference (fig. No.)
Transmitter	F1	2 Slo Blo	11
Receiver	F1	1 Slo Blo	13
Converter	F1	1 Slo Blo	12

c. Be sure that the equipment is complete as listed on the packing slip. If a packing slip is not available, check it against the table of components (par. 5).

17. Siting

a. Locate the radio set so that the antenna can be placed as high above ground level and surrounding objects as possible. An unobstructed line-of-sight path should exist between the antennas and those at the opposite end of the radio link. Signals from the radio transmitter have a much greater range if the antenna is high and clear of hills, buildings, cliffs, woods, and other obstructions. Depressions, valleys, and other low places are poor locations for radio reception and transmission because the surrounding terrain absorbs much of the rf energy. Do not operate the set close to metal structures. The radio set should be housed close enough to the base of the antenna mast so that the length of the available antenna cable will permit the antennas to be mounted as high as possible on the mast. Avoid installing the radio set near sources of radio interference such as power lines, motor pools, or main highways.

b. Place the equipment cabinet on a table or bench capable of supporting the weight of the radio set and within 5 feet of an alternating-current (ac) power outlet. The sides of the equipment cabinet should be kept clear to allow free circulation of air through the side louvers. If possible, the rear of the cabinet should be exposed to allow removal of the rear panel and access to the rear of the component chassis.

18. Installation of Transmitter, Receiver, and Converter

Note. Make arrangements to have a Field Radio Repairman perform the initial adjustments required upon completion of the installation procedures outlined below.

To install the equipment in the equipment cabinet, proceed as follows:

a. Lay the equipment cabinet on its back and remove the 12 mounting screws from the left and right edges of the front opening.

b. Grasp the receiver at the left and right edges of its front panel and lower it into the front opening in the equipment cabinet until it is suspended by the outer edges of its front panel.

c. Aline the holes at the edges of the receiver front panel with the bottom mounting screw holes in the equipment cabinet (as viewed with the equipment cabinet in its normal upright position). Insert and

finger-tighten a mounting screw in each of the four mounting holes.

d. Install the transmitter as outlined for the receiver (c above). Aline the mounting holes in the transmitter front panel with the center pairs of equipment cabinet mounting holes and insert and finger-tighten a mounting screw in each hole.

e. Similarly install the converter in the remaining (top) space in the equipment cabinet.

f. Tighten all mounting screws with a screwdriver and lift the equipment cabinet to its normal upright position.

19. Installation of Antenna AS-813/TRC-47 (fig. 7)

Mount the antennas high enough to allow an unobstructed line-of-sight path to the antennas at the site with which communications are being established. It is preferable to mount each antenna on a separate pole. The distance between the poles is not critical. However, both antennas may be mounted on one pole if the pole is long enough to allow the lower antenna to attain a line-of-sight condition. If both antennas are mounted on one pole, the receiving antenna should be mounted at the top. The transmitting antenna ground plane must be at least 5 feet below the lower pole clamp of the receiving antenna. The pole clamps supplied with the antenna are suitable for use with any type of pole, mast, or tower leg not exceeding 14 inches in diameter. If a suitable pole is not already in place at the antenna site, a utility pole (common telephone pole) at least 30 feet long should be erected. Refer to TM 11-2262, Open Wire Pole Line Construction and Maintenance, for information on pole erection. If a tower leg (or any other structure) made of angle iron is used to support the antennas, a piece of wood or pipe should be placed in the angle at the points where the pole clamps are attached. This provides a larger gripping surface for the pole clamp chain. Assemble the pole clamps and the antennas on the ground. Install each antenna as follows:

a. Assembling and Attaching Pole Clamps.

- (1) Insert a J-bolt through the holes in the bracket on each pole clamp so that the threaded end of the bolt faces the angle in the pole clamp angle plate. Place a washer and nut on each J-bolt and tighten the nuts just enough for the end of each bolt to be flush with the outer side of each nut.

- (2) Unhook the chain from the hooked end of the J-bolt on the upper pole clamp (the one with the hinge bracket) and place the plate against the pole at the height desired for the ground plane. Place the plate so that the end of the clamp with the hinge bracket is uppermost and the angle of the plate points in the desired direction of communication.
- (3) Pass the chain around the pole and rehook the end of the chain to the J-bolt. Tighten the nut on the end of the J-bolt until it takes up enough on the bolt to tighten the chain firmly around the pole. If a pole or mast of very small diameter is used, the take-up with the J-bolt may not be enough. In this case, loosen the J-bolt and rehook the chain at a point three or four links back from the end of the chain.
- (4) Attach the lower pole clamp to the pole so that the holes in the brackets to which the adjustable supports attach are at the lower end and are exactly 44 inches below the mounting holes in the hinge bracket on the upper pole clamp. Attach the clamp as outlined in (2) and (3) above.

b. Assembling Antenna.

- (1) Place the radiator over the slots that run from the center to the front edge of the ground plane. Pass the connector at the radiator base through the center slot and align the holes in the radiator base with the outer slots. Insert a carriage bolt through each hole and the slot below it. Be sure that the bolts are firmly seated in the rectangular holes. Place a flatwasher, lockwasher, and wingnut on each bolt. Tighten the wingnuts.

Caution: Be extremely careful when handling the radiator during the assembly, adjustment, and mounting procedures. The insulator at the base of the radiator element is fragile and can be easily broken if mishandled.

- (2) Align the hole in one end of an adjustable support with the hole in the vertical edge at the side of the ground plane. Insert a bolt through these holes and finger-tighten a nut (over a washer) on its end. Repeat the procedure with the remaining adjustable support and the other side of the ground plane.

- (3) Place a nut and washer, in that order, on the threaded end of a reflector rod. Thread the nut as far as it will go and insert the end of the rod through one of the holes along the edge of the ground plane. Place a washer and nut on the threaded end extending through the ground plane and firmly tighten the nut. Repeat this procedure with all reflector rods.

c. *Adjusting Radiator.* Before mounting the antenna, adjust the height and position of the radiator for the frequency to be used and connect the antenna cable to the radiator. After adjusting the radiator, connect the cable to the radiator connector at the underside of the ground plane. Adjust the radiator as follows:

- (1) Refer to the graph in figure 8. Locate the point that indicates the desired frequency along the base of the graph (horizontal axis). Draw a vertical line perpendicular to the base from that point until it crosses the diagonal line shown on the graph. Draw a horizontal line from the crossing point to the left edge of the graph (vertical axis). The point where this line crosses the vertical axis represents the distance (F) in inches that the radiator should be from the rear of the ground plane.
- (2) Loosen the four wingnuts that hold the radiator to the ground plane and adjust the radiator for the distance determined in (1) above. Retighten the wingnuts.
- (3) Determine the proper height (H) for the radiator element, using the graph in figure 9 the same as in (1) above.
- (4) Loosen the clamp nut on the radiator and slide out the inner rod until the total height of the radiator is correct for the operating frequency. Retighten the clamp nut.

d. Mounting Antenna.

- (1) Use the hole provided and tie a rope to the apex of the antenna, and hoist the antenna assembly up the pole to the desired position. If two antennas are being installed on one pole, complete the upper installation first. *Be sure the radiator and reflectors are turned away from the pole.* Align the holes of the antenna hinge between the bracket holes of the upper pole clamp. Place a flatwasher on the shank of the $\frac{1}{2}$ -inch hinge bolt and insert the bolt through all

three holes. Place another flatwasher on the end of the bolt; screw on and tighten the end nut.

- (2) Grasp the free ends of the adjustable supports and swing them in toward the pole. Use the supports to push the ground plane to a horizontal position. Fasten the adjustable supports to the brackets on the lower pole clamp by using the $\frac{3}{8}$ -inch bolts and washers provided.
- (3) The antenna must be adjusted so that the radiator adjustment slot in the ground plane points directly at the distant antennas with which communications are being established. If the distant antennas are higher or lower than the ones being installed the angle of the ground plane with respect to horizontal must be adjusted. Adjust the ground plane to the desired position (above or below horizontal) by turning the turnbuckles on the adjustable supports. If the range of the turnbuckles is not sufficient, return them to the mid-points in their adjustment range and loosen the lower pole clamp. Move the pole clamp up or down until the ground plane is at approximately the correct position

and retighten the pole clamp. Use the turnbuckles to complete the adjustment to the exact position desired.

- (4) Allow 1 to 2 feet of slack and carefully bind the antenna cable to the mounting pole or mast. Use friction tape or cable clamps. It is important that the weight of the cable be kept off the antenna, particularly in regions where high winds prevail.

20. Connections

After installing the components, connect them according to the cabling diagram (fig. 10). Remove the rear panel of the equipment cabinet to gain access to the various receptacles at the rear of the components. When connecting the audio cable, be sure that the branched end with the 10-contact connector is connected to the transmitter and that the one with the 12-contact end is connected to the receiver. Cord CG-122A/U need be used only when the 150-foot antenna cable is not long enough. If the 150-foot antenna cable is of sufficient length it should be connected directly to the equipment. After connecting all cables, replace the rear panel. Guide all external cables through the cutouts at the lower left- and right-hand corners of the rear panel.

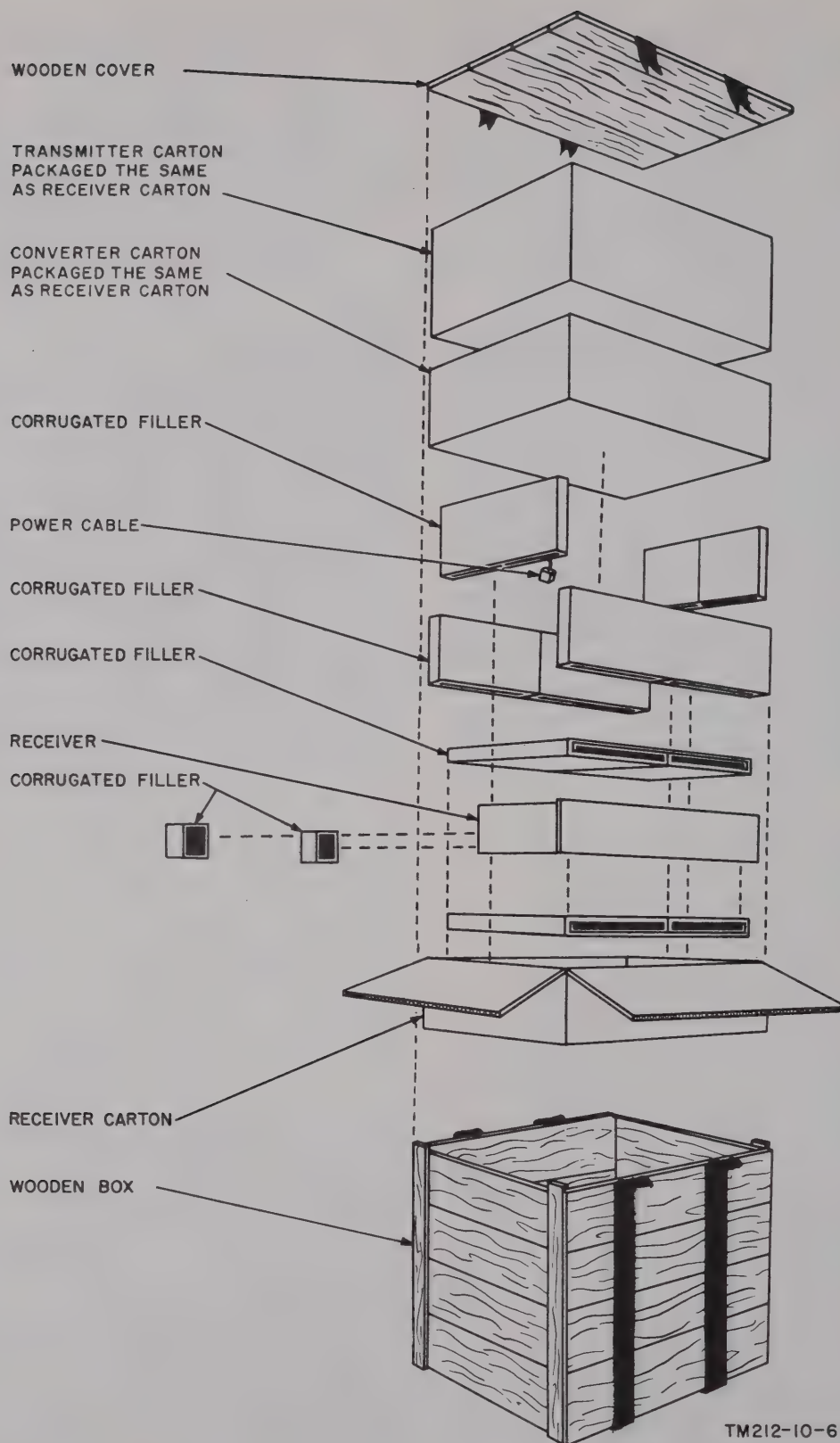
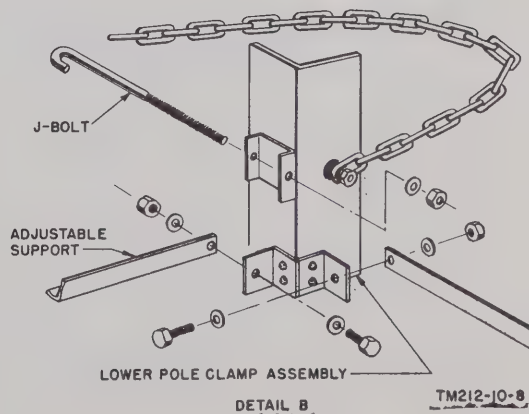
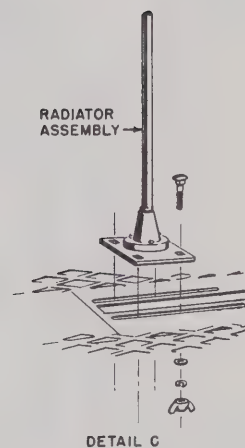
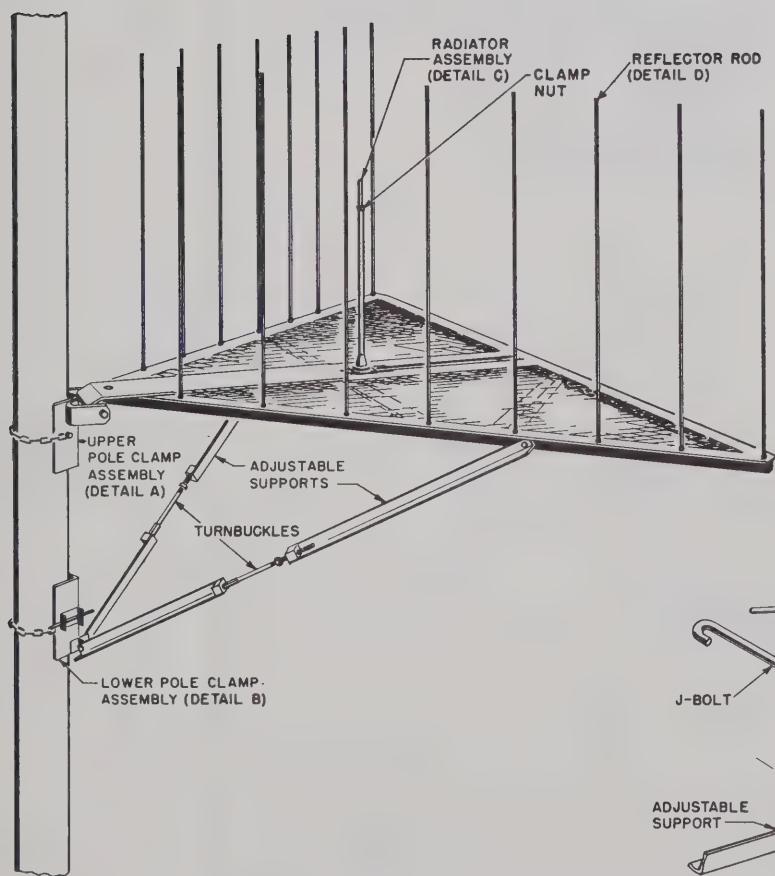
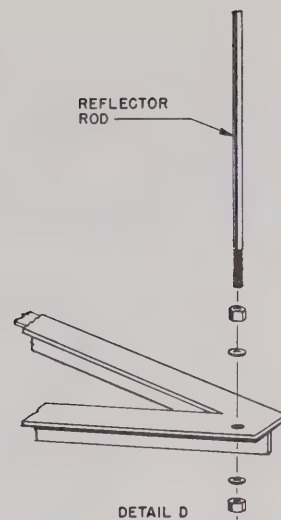
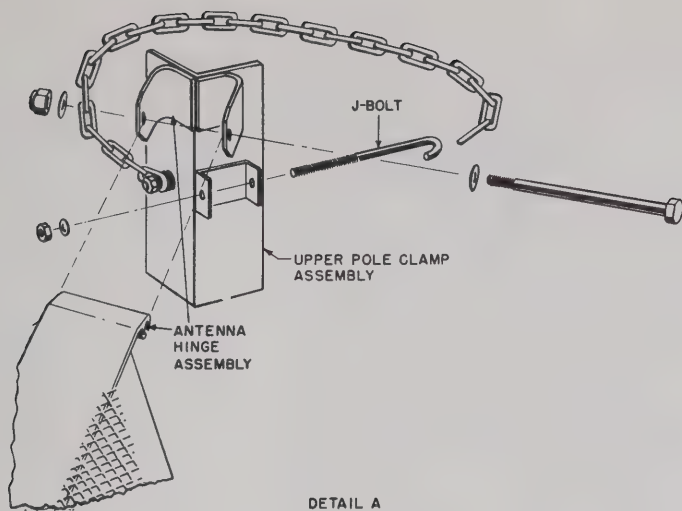


Figure 6. Typical packing.



TM212-10-8

Figure 7. Assembly and installation of antenna AS-813/TRC-47.

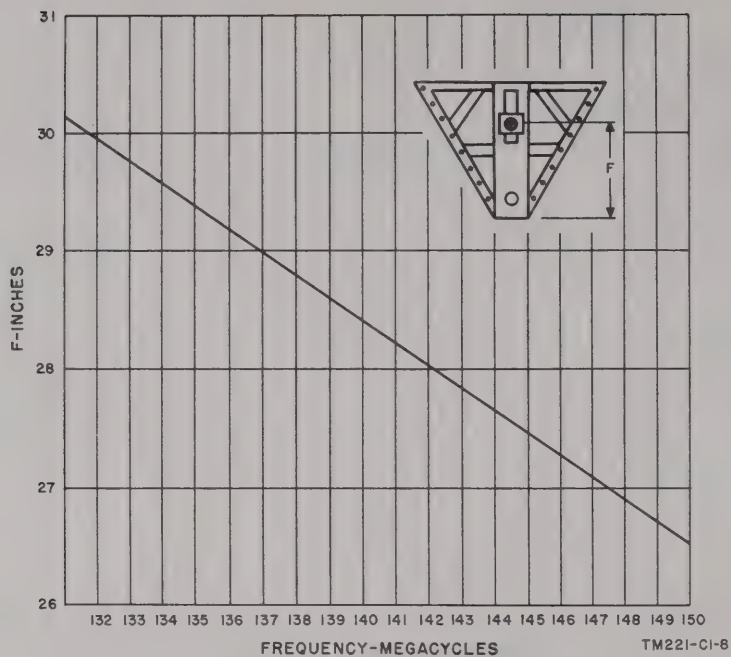


Figure 8. Antenna radiator, position adjustment graph.

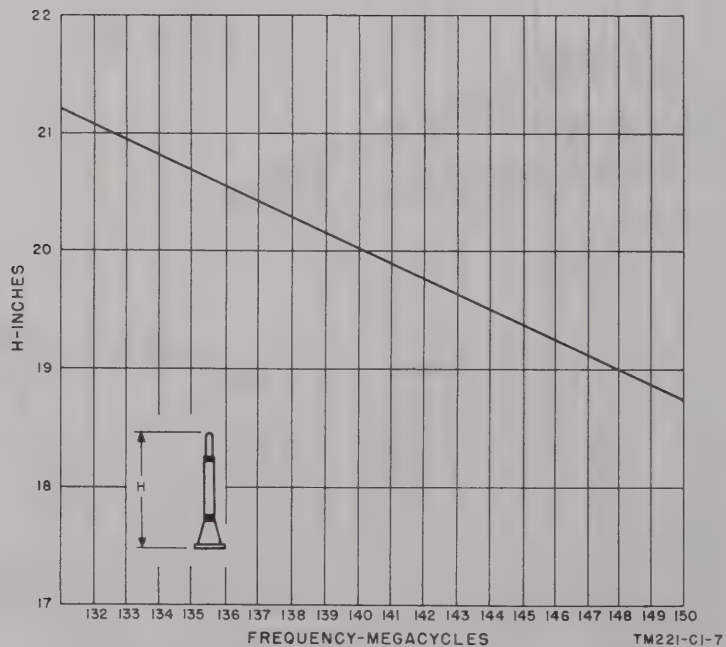
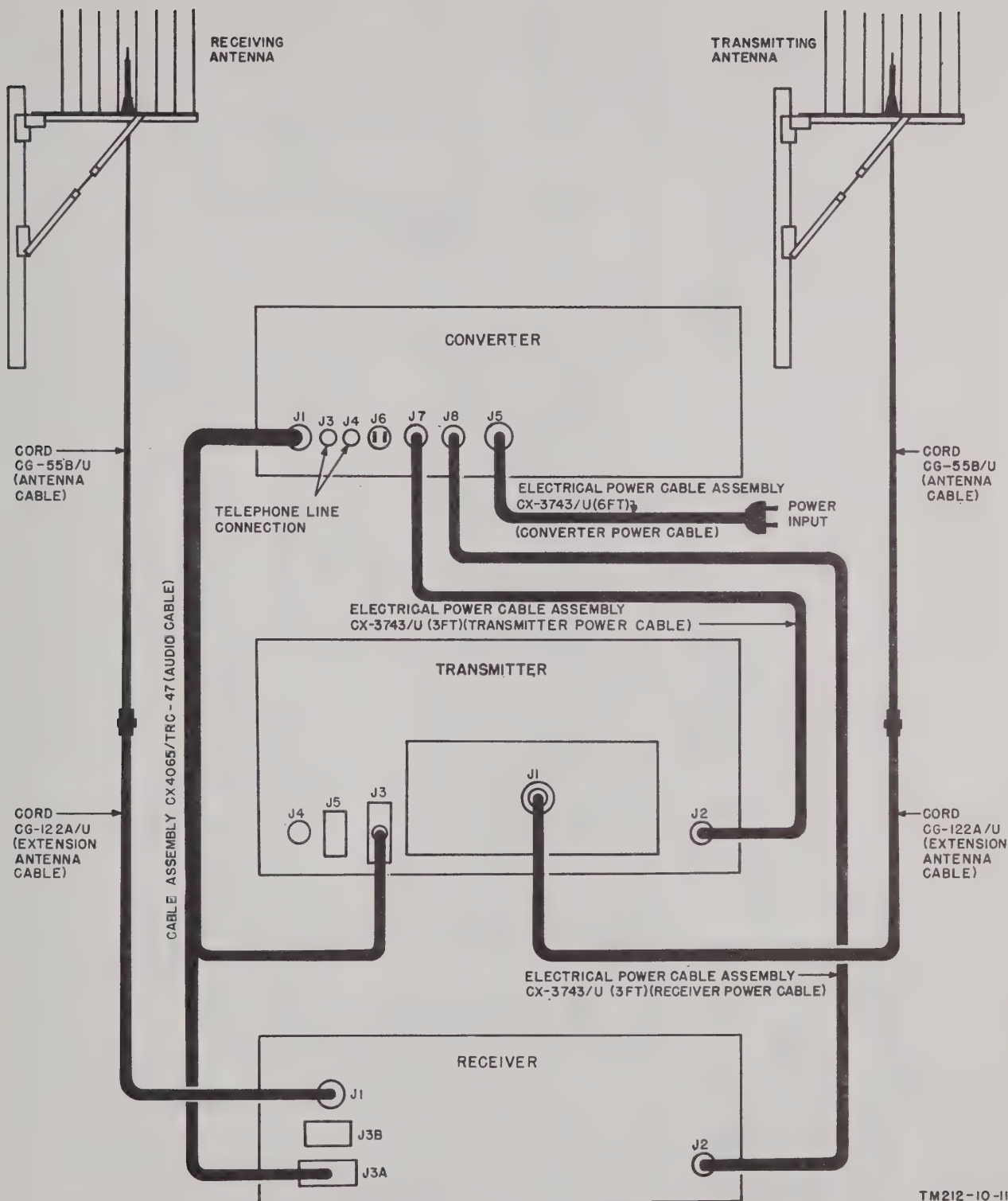


Figure 9. Antenna radiator, height adjustment graph.



TM212-10-11

Figure 10. Radio set AN/TRC-47, cabling diagram.

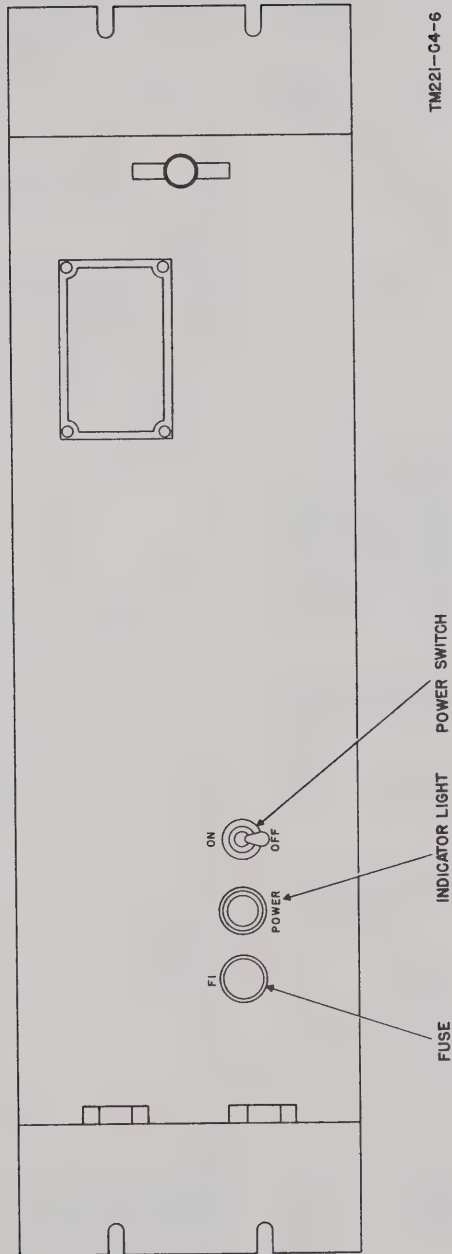


Figure 12. Telephone signal converter CV-542/TRC-47, operating controls.

TM221-04-6

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

Note. This section describes, locates, and illustrates the controls and instruments provided for the operator to properly operate the equipment.

21. Radio Receiver R-748(*)/TRC-47, Operating Controls (fig. 13)

The following table lists the receiver operating controls and their functions:

Control	Function
ON-OFF switch-----	Turns receiver on and off.
SENSITIVITY control	Varies the sensitivity of the receiver.
VOLUME control-----	Varies the volume of the sound from the loudspeaker.
SQUELCH-OPEN switch.	In the SQUELCH position, allows the audio to be squelched during no signal conditions. In the OPEN position, removes the squelch action from the receiver.
POWER indicator light	Lights when power is applied to receiver.
STDBY indicator light-	Lights under no signal conditions. Goes out when distant transmitter operates and signal is received.
REC indicator light----	Lights when receiver is receiving a signal.

22. Radio Transmitter T-593(*)/TRC-47, Operating Controls (fig. 11)

The following table lists the transmitter operating controls and instruments and their functions:

Control or instrument	Function
FIL switch-----	In ON position, applies power to transmitter tube filaments and places transmitter in readiness for operation. In OFF position, removes all power from transmitter.
PLATE switch-----	In ON position, applies plate power to transmitter circuits and puts transmitter in operation (FIL switch must be in ON position). In OFF position, removes plate power leaving transmitter in standby condition.

Control or instrument	Function																										
FIL indicator light----	Lights when FIL switch is in ON position and ac power is applied to transmitter.																										
PLATE indicator light-	Lights when plate power is applied and transmitter is operating.																										
MIC jack-----	Not used for Radio Set AN/TRC-47.																										
TUNING METER-----	Indicates current in any one of 11 transmitter circuits as determined by METER SWITCH.																										
METER SWITCH----	Connects meter to any one of 11 transmitter circuits. Functions of switch positions are as follows:																										
	<table> <tr> <th>Position</th><th>Function</th></tr> <tr> <td>OFF</td><td>Shorts meter terminals.</td></tr> <tr> <td>OSC I_G</td><td>Indicates oscillator grid current.</td></tr> <tr> <td>OSC I_K</td><td>Indicates oscillator cathode current.</td></tr> <tr> <td>1 TRIP I_G</td><td>Indicates grid current of first tripler.</td></tr> <tr> <td>1 TRIP I_K</td><td>Indicates cathode current of first tripler.</td></tr> <tr> <td>2 TRIP I_G</td><td>Indicates grid current of second tripler.</td></tr> <tr> <td>2 TRIP I_K</td><td>Indicates cathode current of second tripler.</td></tr> <tr> <td>DRIVER I_G</td><td>Indicates grid current of driver.</td></tr> <tr> <td>DRIVER I_K</td><td>Indicates cathode current of driver.</td></tr> <tr> <td>PA I_G</td><td>Indicates grid current of power amplifier.</td></tr> <tr> <td>PA I_P</td><td>Indicates plate current of power amplifier.</td></tr> <tr> <td>MOD I_K</td><td>Indicates cathode current of modulator tubes.</td></tr> </table>	Position	Function	OFF	Shorts meter terminals.	OSC I _G	Indicates oscillator grid current.	OSC I _K	Indicates oscillator cathode current.	1 TRIP I _G	Indicates grid current of first tripler.	1 TRIP I _K	Indicates cathode current of first tripler.	2 TRIP I _G	Indicates grid current of second tripler.	2 TRIP I _K	Indicates cathode current of second tripler.	DRIVER I _G	Indicates grid current of driver.	DRIVER I _K	Indicates cathode current of driver.	PA I _G	Indicates grid current of power amplifier.	PA I _P	Indicates plate current of power amplifier.	MOD I _K	Indicates cathode current of modulator tubes.
Position	Function																										
OFF	Shorts meter terminals.																										
OSC I _G	Indicates oscillator grid current.																										
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1 TRIP I _G	Indicates grid current of first tripler.																										
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2 TRIP I _G	Indicates grid current of second tripler.																										
2 TRIP I _K	Indicates cathode current of second tripler.																										
DRIVER I _G	Indicates grid current of driver.																										
DRIVER I _K	Indicates cathode current of driver.																										
PA I _G	Indicates grid current of power amplifier.																										
PA I _P	Indicates plate current of power amplifier.																										
MOD I _K	Indicates cathode current of modulator tubes.																										

23. Telephone Signal Converter CV-542/TRC-47, Operating Controls (fig. 12)

The only operating control on the converter is the ON-OFF switch. This switch controls the power to the unit. A POWER indicator light indicates, by lighting, when the ON-OFF switch is in the ON position and power is applied.

24. Starting Procedure

- a. Place the power switch on the converter, transmitter, and receiver in the ON position.
- b. Allow 5 minutes for the equipment to warm up and place the transmitter PLATE switch in the ON position.
- c. Adjust the SENSITIVITY and squelch controls as follows:

- (1) Turn the SENSITIVITY control completely clockwise.
- (2) While no signal is being received, set the SQUELCH-OPEN switch to the SQUELCH position and rotate the SENSITIVITY control counterclockwise until the noise from the receiver quiets. If squelch action is not desired, place the squelch switch in the OPEN position after the above adjustment is made.

25. Operation

No action is required on the part of an operator to control the equipment after it has been started (par. 24). The radio set automatically receives and passes to the telephone lines all incoming voice and ringing signals from the distant station and automatically transmits to the distant station all outgoing voice and ringing signals from the telephone line. However, after it has been determined that satisfactory communication has been established with the distant station, the operator should record the normal reading on the transmitter TUNING METER for each position of the METER SWITCH. These normal readings then may be used as a reference when checking for normal operation (par. 30).

26. Antijamming Information

a. *Recognition and Identification of Jamming.* Jamming of a receiver is accomplished by the enemy transmitting a strong signal on the same frequency as the desired signal. This causes strong interference and unusual noises in the receiver and destroys the intelligibility of the desired signal. However, unusual noises and interference in the receiver also may be caused by a defect in the receiver. To determine whether the interference is originating in the receiver, disconnect the antenna cable and short terminal J1 at the rear of the receiver to the chassis.

If the interference continues, the receiver is defective. Jamming signals may consist of noise, laughter, singing, music, various tones (steady or keyed), or most any unusual sound or combination of these sounds. For the purpose of identification some of the more prominent types of jamming are described below.

- (1) *Spark.* This is one of the simplest, most effective, and most easily produced jamming signals. It sounds very rough and raspy and sometimes like an electric motor with sparking brushes. This type of signal is very broad and interferes with a large portion of the frequency spectrum.
- (2) *Sweep-through.* This signal is the result of sweeping or moving a carrier back and forth across the frequency at a slow or rapid rate. It produces a sound such as that of a low-flying plane passing overhead. This type of jamming is effective over a broad range of frequencies and when varied rapidly is very effective against all types of voice signals.
- (3) *Stepped tones or bagpipes.* This signal usually consists of several separate tones transmitted in the order of increasing pitch and then in the order of decreasing pitch. This is repeated over and over. The audible effect is like the sound of a Scottish bagpipe.
- (4) *Noise.* Noise is considered one of the better types of jamming. It produces a sound similar to that heard when a receiver is not tuned to a station and the volume or gain control is turned to maximum. For this reason it is sometimes very hard to detect as jamming.
- (5) *Gulls.* This signal consists of a quick rise and slow fall of a variable audio frequency. The sound is similar to the cry of the sea gull.
- (6) *Tone.* This signal consists of a single audio frequency of unvarying tone. It produces a steady howl. Another use of tone is to vary it slowly. This produces a howling sound of varying pitch.

b. Antijamming Procedures. If it is known or suspected that the receiver is being jammed, notify the immediate superior officer immediately and allow the equipment to continue to operate. Attempt to increase the intelligibility of the desired signal as outlined below.

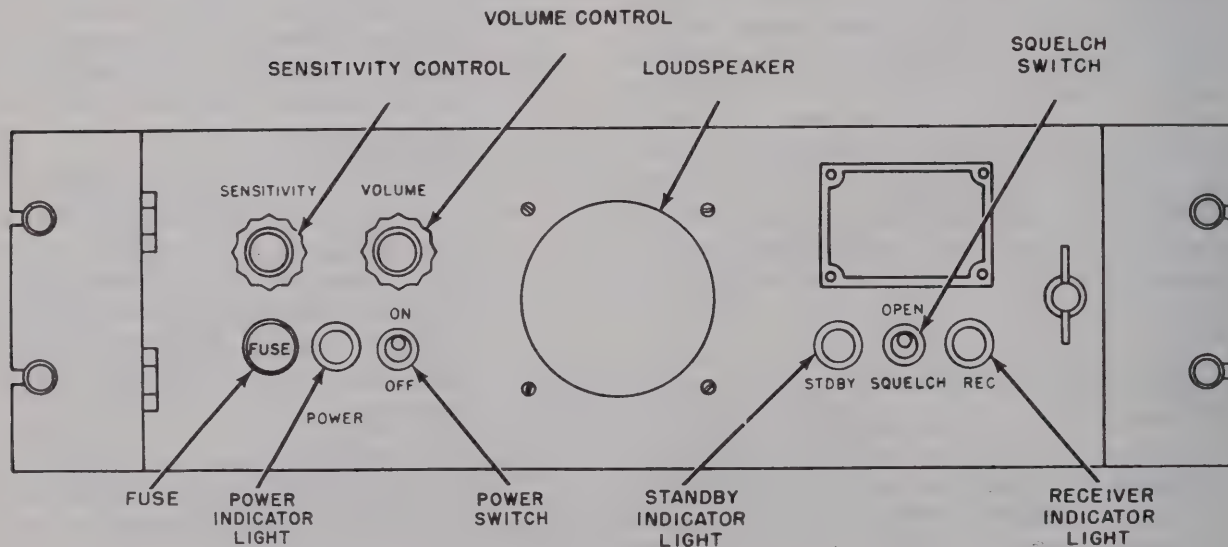
- (1) Turn the SENSITIVITY control clockwise to increase the sensitivity. This may drive a stronger jamming signal to saturation and raise the level of the weaker desired signal so that read-through is possible.
- (2) Turn the SENSITIVITY control counter-clockwise. If the desired signal is stronger than the jamming signal, the reduction in sensitivity may eliminate the jamming and allow the desired signal through.
- (3) Using the turnbuckles on the ground plane supporting legs, adjust the angle of the receiving antenna above and below the horizontal. This may alter the radiation pattern enough to exclude the jamming signal. If necessary reposition the lower antenna pole clamp to obtain greater angular adjustment.

- (4) Rotate the antenna to either side of its normal position on the pole. This may allow reception of a reflection of the desired signal while excluding the jamming signal.
- (5) If the above procedures do not provide sufficient signal separation for operation, request that the operating frequency be changed.

27. Stopping Procedure

a. Radio Set AN/TRC-47 is designed for continuous operation and the life of the tubes will be extended if the filaments remain lighted. Therefore, the equipment should not be turned off as long as it is operating normally.

b. The transmitter may be placed in a standby condition by placing the PLATE switch in the OFF position. This removes plate power and allows the filaments to remain lighted. When necessary, all power may be removed from the equipment by placing the converter ON-OFF switch, the receiver ON-OFF switch, and the transmitter FIL switch in the OFF position.



TM212-10-17

Figure 13. Radio Receiver R-748(*)/TRC-47, operating controls.

CHAPTER 4

MAINTENANCE INSTRUCTIONS

28. Scope of Operator's Maintenance

The maintenance duties normally performed by the operator of the radio set are limited to those listed in paragraphs 29 and 30. These procedures do not require special tools or test equipment.

29. Preventive Maintenance

a. DA Form 11-238 (figs. 14 and 15) is a preventive maintenance list to be used by the operator. Items not applicable to operator's maintenance of this radio set are lined out in the figure. References in the ITEM block in the figure are to paragraphs that contain information that will be helpful when performing the maintenance. Instructions for the use of the form appear on the form.

b. For all cleaning operations, use a clean cloth and remove dust, dirt, moisture, and grease from all parts of the equipment. If necessary, wet the cloth with Cleaning Compound (Federal Stock No. 7930-395-9542) and then wipe the parts with a dry clean cloth.

30. Checks for Normal Operation

a. The operator of the radio set should periodically check to see that the equipment is operating normally. Any faulty operation that may be detected should be reported to a Field Radio Mechanic for repair.

b. To check the receiver, simply listen to the receiver speaker and determine that the incoming audio is clear and intelligible.

c. To check the transmitter, use the front panel TUNING METER. Turn the METER SWITCH to each position in turn and observe the meter indications. The meter readings should agree with the normal readings recorded when the equipment first was placed in operation (par. 25). The meter readings will vary slightly at different power outputs. Meter indications for a normally operating transmitter with a power output of 1 watt are shown in the following chart:

METER SWITCH position	Normal meter indications
OSC I _G -----	.42
OSC I _K -----	.55
1 TRIP I _G -----	.44
1 TRIP I _K -----	.32
2 TRIP I _G -----	.44
2 TRIP I _K -----	.54
DRIVER I _G -----	.37
DRIVER I _K -----	.41
PA I _G -----	.58
PA I _P -----	.24
MOD I _K -----	.66

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS		CONDITION
26. INSPECT ANTENNA FOR ECCENTRICITIES-CORROSION, LOOSE FIT, DAMAGED INSULATION AND REFLECTORS.		
27. CHECK FOR NORMAL OPERATION:		
28. BEFORE SHUTTING OR STORING, REMOVE BATTERIES.		
IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.		

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT SOUND EQUIPMENT, RADIO, DIRECTION FINDING RADAR, CARRIER, RADIOSONDE AND TELEVISION (AR 750-625)																										
EQUIPMENT NOMENCLATURE RADIO SET AN/TRC-47																										
EQUIPMENT SERIAL NUMBER 000-00																										
<p align="center">INSTRUCTIONS</p> <p>This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.</p> <ol style="list-style-type: none"> For detailed Preventive Maintenance instructions see: <ol style="list-style-type: none"> The Technical Manual (in TM 11 series) for the equipment. (See DA Pamphlet Number 310-4) The Supply Bulletin (SB 11-100 series) for the equipment. (See DA Pamphlet Number 310-4) The Department of the Army Lubrication Order. (See DA Pamphlet Number 310-4) The following action will be taken by either the Communications Officer/Chief for 1st echelon, or the Inspector for higher echelon: <ol style="list-style-type: none"> Enter Equipment Nomenclature and Serial Number. Strike out items that do not apply to the equipment. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND. After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor. 																										
<p align="center">TYPE OF INSPECTION</p> <table border="1"> <thead> <tr> <th>OPER- ATOR</th> <th>2/3 EC- HELON</th> <th>DATE</th> <th>SIGNATURE</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td></td> <td>7 Oct 57</td> <td>P. Enform</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			OPER- ATOR	2/3 EC- HELON	DATE	SIGNATURE	✓		7 Oct 57	P. Enform																
OPER- ATOR	2/3 EC- HELON	DATE	SIGNATURE																							
✓		7 Oct 57	P. Enform																							

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-246, 11-248, 11-249, 11-250, AND 11-281; WHICH ARE OBSOLETE.

DA FORM 11-238
1 MAY 57

4

Figure 14. DA Form 11-238, pages 1 and 4.

TM212-10-18

LEGEND for marking conditions: Satisfactory, Y. Adjustment, Repair or Replacement required, X. Defect corrected, (X).		DAILY CONDITION FOR MONTH OF OCTOBER																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20 3D ECH- ELON		
NO.	DAILY ITEM	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. (Transmitter, receiver, cabling, cases, wire, cables, microphones, tubes, spare parts, technical manuals).	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
2.	CLEAN DIRT AND MOISTURE FROM ANTENNA-HERO- PHONE-HEADSETS-KEY-JACKS. PLUGS. COMPONENT PANELS. PAR 34b	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
3.	INSPECT CONTROLS FOR NORMAL OPERATION. TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OUT FROM LOOSE CONTACTS.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
		ADDITIONAL ITEMS FOR 2D AND 3D ECHOLON INSPECTIONS																CONDITION		
5.	CLEAN AND TIGHTEN EXTERIORS OF BASEST RACKS-MOUNTS-TRANSMISSION LINES	15. INSPECT SEATING OF READILY ACCESSIBLE PLUG- OUT ITEMS: TUBES-LAMPS-FUSES-CRYSTALS- CONNECTORS-VIBRATORS-PLUG-IN-BOLES-																		
6.	INSPECT CASES-MOUNTS-ANTENNA- TOWERS-AND EXPOSED METAL SURFACES FOR RUST-CORROSION	16. INSPECT RELAYS AND CIRCUIT BREAKERS FOR LOOSE MOUNTING-AND CONTACT MIS-ALIGNMENT OF GON- TACTS-AND SPRINGS-PROP-ORRING-TENSION-																		
7.	INSPECT CORROSION-CHOLE-WIRE- SHOEN-MOUNTS FOR CUTS-RINGS- SHAKES-FRATTING-UNDOE STRAIN	17. INSPECT VARIABLE CAPACITORS FOR DIRT-MIS-ALIGNMENT OF PLATES-LOOSE MOUNTINGS-MOISTURE-																		
8.	CHECK ANTENNA-GUN-WIRES FOR PROPER TENSION-OR-DAMPST	18. INSPECT RESISTORS-BUSHINGS AND HOULATIONS FOR CRACKS SHIPPING-BUSHINGS-MOISTURE-DECONTAMINATION-																		
9.	INSPECT CANNING AND LEATHER- TIES FOR MILDOW-TEARS-FRANNING	19. CLEAN AND TIGHTEN SWITCHES-TERMINAL BLOCKS BLOWER-RELAY-GAS-AND INTERIORS OF SHADES AND CABINETS NOT READILY ACCESSIBLE.																		
10.	INSPECT ACCESSIBLE ITEMS FOR LOOSE- NUTS-WITHES-NEEDS-TOO-TIGHT-CONNECTORS- NUTS-LOOSENESS-ETC	20. INSPECT TERMINAL BLOCKS FOR LOOSE- CONNECTIONS-GRINDS-AND-SKEWER-																		
11.	CLEAN AND/OO-INSPECT AIR-FILTERS-GRASS- NAME PLATES-SHA-AND-METER-WINDOW	21. INSPECT TERMINALS OF LARGES-PIES-EXPANSION-AND- RESTORATION FOR DIRT-CORROSION-LOOSE-CONTACTS-																		
12.	INSPECT STORAGE-BATTERIES FOR DIRT-LOOSE- TERMINALS-SEALING-SHAFTS-SHIMMERS-SHOES INSPECT DRY-BATTERIES FOR LEAKAGE	22. INSPECT TRANSFORMERS-CHOICES-ROSE-INDUCTION- AND-RESISTANCE FOR OVERHEATING-AND-ON-LEAKAGE-																		
		23. INSPECT GENERATORS-AMPLIFIERS-DUAL- WATERS-PORT-BRUSH-WEAR-SPRING-TENSION- WASING-AND-FITTING OF COMMUTATOR-																		
		24. INSPECT CATHODE-RAY-TUBES- FOR BURN-SCORCH-SPOTS-																		
		25. INSPECT WATERPROOF-CASES FOR LEAKS-NORM-OR-LOOSE-PARTS-																		
		CONTINUED ON PAGE 4																		

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Figure 15. DA Form 11-258, pages 2 and 3.

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CHAPTER 5

DEMOLITION TO PREVENT ENEMY USE

31. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. The destruction procedures outlined in paragraph 32 will be used to prevent further use of the equipment.

32. Methods of Destruction

Use any of the following methods to destroy the equipment:

a. Smash. Smash the controls, tubes, coils, switches, capacitors, transformers, and meter; use sledges, axes, handaxes, pickaxes, hammers, or crowbars.

b. Cut. Cut the audio, power, and antenna cables; use axes, handaxes, or machetes.

c. Burn. Burn cords and technical manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend front panels, chassis, equipment cabinet, antenna ground plane, radiator, and reflector rods.

e. Explode. If explosives are necessary, use fire-arms, grenades, or TNT.

f. Dispose. Bury or scatter the destroyed parts in slit trenches, fox holes, or throw them into streams.

APPENDIX

OPERATOR MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

FOR

RADIO SET AN/TRC-47

Section I. General

1. Scope

a. *General.* This appendix lists items supplied for initial operation and for running spares and accessories. The list includes tools, accessories and similar material issued as part of the major end item. This portion lists the basic allowance data for parts and accessories required for maintenance of Radio Set AN/TRC-47. These equipments are issued on the basis of allowances prescribed in equipment authorization tables and other documents which are a basis for requisitioning.

b. *Columns.*

- (1) *Federal or technical service stock number.* The stock number column lists the 11 digit Federal stock number assigned by the Cataloging Division, OASD (S&L). In the absence of a Federal stock number, the technical service stock number will be used for requisitioning purposes.
- (2) *Designation by model.* This column lists parts for two or more models of a particular equipment or when differences in the same model occur. A dagger (†) indicates the model in which the part is used.
- (3) *Description.* Nomenclature or the standard item name and brief identifying data for each item is listed in this column. When requisitioning, enter the nomenclature and description on the requisition.
- (4) *Unit of issue.* The unit of issue is the supply medium by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.
- (5) *Expendability.* Expendable items are indicated by the letter X; nonexpendable items are indicated by NX.
- (6) *Quantity authorized.* Under "Items Comprising an Operable Equipment" the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spares and Accessories" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on

hand by the operator for maintenance of the equipment.

- (7) *Illustration.* The illustration columns refer to either the diagrams or illustrations in which the item appears. References appearing in the Item No. Column are a combination of signs or symbols used for identification of the items appearing in illustrations or schematic diagrams shown in this manual, supplemental circuit labels, or technical bulletins.

2. Abbreviations

accom	accommodate (s) (ing)
amp	ampere
AWG	American Wire Gauge
blk	black
cond	conductor (s)
cyc	cycle(s)
cyl	cylinder (s)
fl	focal length
freq	frequency (ies)
kc	kilocycle (s)
mc	megacycle (s)
min	minimum
mtd	mounted
mtg	mounting
mts	mounts
od	outside diameter
ph	phase
term	terminal (s)
tol	tolerance
v	volt
w	watt (s)

3. Contents

The major items of Radio Set AN/TRC-47 appear in the following sequence:

Radio Set AN/TRC-47
Converter Telephone, Signal CV-542/TRC-47
Receiver, Radio R-748/TRC-47
Transmitter, Radio T-593/TRC-47

4. Comments or Suggestions

Any comments concerning omissions and discrepancies in this manual will be prepared on DA Form 2028 and forwarded direct to Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, N. J., ATTN: SIGFM/ES-ML.

Section II. OPERATOR MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

(1) Federal or technical service stock No.	(2) Designation by model	(3) Description	(4) Unit of issue	(5) Expend- ability	(6) Quantity authorized	(7) Illustration	
						Figure No.	Item No.
		RADIO SET AN/TRC-47					
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
5820-511-4269		RADIO SET AN/TRC-47: 132 to 150 mc range, 1 channel; 115 v or 230 v, 50-400 cyc; single phase.	ea	NX	2		
5820-511-4249		ANTENNA AS-813/TRC-47: reflector-corner, style 11, Ref dwg group 11; 132 to 150 mc freq range; pole mtd.	ea	NX	2		
5820-646-4799		CABINET, ELECTRICAL EQUIPMENT CY-2126/TRC-47: steel; 22½ in. w x 14¾ in. lg x 21¼ in. h; Varo Mfg Co No. 15592.	ea	NX	1		
5995-564-9690		CABLE ASSEMBLY, SPECIAL PURPOSE CX-4065/TRC-47: 25 in. lg o/a.	ea	X	1		
5995-542-6008		CABLE ASSEMBLY, RF CG-1222A/U: uses RG-8A/U cable; 50 ft lg o/a.	ea	X	4		
5995-521-0309		CABLE ASSEMBLY, RF CG-55B/U: uses cable RG-8A/U; 150 ft lg.	ea	X	2		
5805-563-1888		CONVERTER, TELEPHONE SIGNAL CV-542/TRC-47: ring down signal; 60 to 400 cyc; single ph; 5¼ in. h x 14½ in. d x 19 in. w o/a.	ea	NX	1		
5820-503-1395		RECEIVER, RADIO R-748/TRC-47: R-748A/TRC-47: 132 to 150 mc; single channel; 115-230 v, 50 to 400 cyc; single ph; 14½ in. d x 19 in. w x 5¼ in. h.	ea	NX	1		
5820-697-6797		TRANSMITTER, RADIO T-593/TRC-47: T-593A/TRC-47: 132 to 150 mc; 115-230 v, 50-400 cyc; single ph; 14½ in. d x 19 in. w x 5¼ in. h.	ea	NX	1		
		CONVERTER, TELEPHONE SIGNAL CV-542/TRC-47					
5805-563-1888		CONVERTER, TELEPHONE SIGNAL CV-542/TRC-47: ring down signal; 60 to 400 cyc; single ph; 5¼ in. h x 14½ in. d x 19 in. w o/a.	ea	NX	1		
5995-553-7596		CABLE ASSEMBLY, POWER, ELECTRICAL: 2 cond No. 16 AWG 500 v w; 6 ft o/a lg; Varo No. 15863.	ea	X	1		
5920-553-2583		CAP, ELECTRICAL, FUSEHOLDER: blk; ⅝ in. dia. x ⅞ in. lg o/a; Bussman No. HKP-HQR.	ea	X	1		
5960-237-6917		ELECTRON TUBE: MIL type JAN 5725/6AS6W	ea	X	1		
5960-262-0167		ELECTRON TUBE: MIL type JAN 12AT7WA	ea	X	3		
5960-188-3551		ELECTRON TUBE: MIL type JAN 6AK6	ea	X	1		
5960-166-7648		ELECTRON TUBE: MIL type JAN OB2	ea	X	1		
5960-188-3564		ELECTRON TUBE: MIL type JAN OA2	ea	X	2		

XFIB
V1
V2 V3 V5
V4
V6
V7 V8

5960-188-0880					ELECTRON TUBE: MIL type JAN 6X4W-----	ea	X	3	V9 V10 V11	
5920-636-3047					FUSE: 1 amp, 250 v; type No. MS90079-24-----	ea	X	1	F1	
6240-155-8706					LAMP, INCANDESCENT: 6 to 8 v; min bayonet 2 term; clear, T-3¼; GE No. 47.	ea	X	1	DS1	
6240-143-3063					LAMP, INCANDESCENT: 120 v, 6 w; clear; 1¾ in. max lg o/a; GE No. 6S6DC.	ea	X	1	RT1	
5960-262-0015					SHIELD, ELECTRON TUBE: 7 pin min; JAN type TS102U01.	ea	X	1	EV1	
5960-264-3004					SHIELD, ELECTRON TUBE: 9 pin min; JAN type TS103U02.	ea	X	3	EV2 EV3 EV5	
5960-272-9094					SHIELD, ELECTRON TUBE: 7 pin min; JAN type TS102U02.	ea	X	2	EV4 EK4	
5960-295-7652					SHIELD, ELECTRON TUBE: 7 pin min; JAN type TS102U03.	ea	X	6	EV6 EV7 EV8 EV9 EV10 EV11	
5820-503-1395	1	2			RECEIVER RADIO R-748/TRC-47; R-748A/TRC-47 Model Column 1 refers to R-748/TRC-47, Column 2 refers to R-748A/TRC-47.	ea	NX	2		
5995-542-6283					RECEIVER RADIO R-748/TRC-47; R-748A/TRC-47: 132 to 150 mc; single channel; 115-230 v, 50-400 cyc; single pb; 14½ in. d x 19 in. w x 5¼ in. h. CABLE ASSEMBLY, POWER ELECTRICAL: 36 in. lg o/a; Varo Mfg Co. No. 15864.	ea	X	1	W2	
5955-129-8799	†	†			NOTE. The Crystal Unit will be requisitioned in the quantities and frequencies as authorized by the Army Commander or Theater of Operations Commander. CRYSTAL UNIT, QUARTZ, CR-18/U----- CRYSTAL UNIT QUARTZ: Crystal Unit CR-18/U incl xtal plate; 6425 kc ±0.005% tol freq; 4¾ in. lg x ¾ in. w x 1½ in. d. ELECTRON TUBE: MIL type No. 5654/6AK5W-----	ea ea	NX NX	1 1	Y1 Y2	
5960-262-1357	†	†			ELECTRON TUBE: MIL type 12AT7WA----- ELECTRON TUBE: MIL type 5749/6BA6W----- ELECTRON TUBE: MIL type 6J6W----- ELECTRON TUBE: MIL type 6005/6AQ5W----- ELECTRON TUBE: MIL type 12AX7----- ELECTRON TUBE: MIL type OB2WA----- ELECTRON TUBE: MIL type JAN 6AX5GT----- FUSE CARTRIDGE: 1 amp; 250 v slow acting; MIL FO2G1ROOB.	ea ea ea ea ea ea ea ea	X X X X X X X X	4 1 2 2 1 1 2 1 1	V1 V2 V3 V4 V5 V6 V7 V8 V10 V9 V11 V12 V13 V14 F1	
5960-262-0167	†	†								
5960-264-2089	†	†								
5960-228-3764	†	†								
5960-248-3089	†	†								
5960-166-7664	†	†								
5960-262-3763	†	†								
5960-188-0943	†	†								
5920-636-3047	†	†								

(1) Federal or technical service stock No.	(2) Designation by model	(3) Description	(4) Unit of issue	(5) Expend- ability	(6) Quantity authorized	(7) Illustration	
						Figure No.	Item No.
		RECEIVER RADIO R-748/TRC-47; R-748A/TRC-47— <i>Continued</i>					
6240-155-8706	†	LAMP, INCANDESCENT: miniature bayonet base; 6-8 v type 47 per Fed. Spec W-L-116.	ea	X	3		DS1 DS2 DS3
6240-019-3146	†	LAMP, INDICATOR: 6-8 v, 15 amp; miniature screw base; T-3¼ clear; 1½ in. lg Mazda No. 40.	ea	X	3	4	DS1 DS2 DS3
6210-500-4024	†	LIGHT, INDICATOR: accom min screw T-3¼ bulb; 1½ in. lg x ⅞ in. w x 1½ in. h; Drake Mfg No. 20S.	ea	X	3	4	XDS1A XDS2A XDS3A
5960-262-0015	†	SHIELD, ELECTRON TUBE: cylindrical; open top; 1½ in. lg x 0.930 in. dia; bayonet mtg; JAN type TS102U01.	ea	X	4		E3 E4 E5 E6
5960-264-3004	†	SHIELD, ELECTRON TUBE: cyl shape, open top; 1½ in. lg x 1.050 in. dia; mts on socket ft; JAN type TS103U02.	ea	X	2		E7 E13
5960-272-9094	†	SHIELD, ELECTRON TUBE: straight cyl, open top; 1¼ in. x 0.950 in; spring mtd; JAN type TS102U02.	ea	X	4		E8 E9 E10 E15
5960-295-7652	†	SHIELD, ELECTRON TUBE: cyl, open top; bayonet mtg; 0.930 in. od x 2¼ in. h; JAN type TS102U03.	ea	X	3		E11 E12 E14
5935-502-9369	†	SHIELD, ELECTRON TUBE SOCKET: rectangular; 1½ in. lg x ¼ in. w x ⅜ in. h; foot bracket mtd; EF Johnson No. 133-280.	ea	X	1		E16
		TRANSMITTER, RADIO T-593/TRC-47; T-593A/TRC-47					
5820-697-9797		Model Column 1 refers to T-593/TRC-47; Column 2 refers to T-593A/TRC-47. TRANSMITTER, RADIO T-593/TRC-47; T-593A/ TRC-47; 132 to 150 mc freq; 7 w output; 115-230 v, 50- 400 cyc; 14½ in. d x 19 in. w x 5¼ in. h; Varo Mfg No. S231D.	ea	NX	2		
5995-542-6283	†	CABLE ASSEMBLY, POWER, ELECTRICAL: 3 ft o/a lg incl term; 1st end Belden Connector H-1289; 2d end Plug UP120M; Varo Mfg No. 15864.	ea	X	1	2	W2
		<i>Note.</i> The Crystal Unit will be requisitioned in the quantities and frequencies as authorized by the Army Commander or Theater of Operations Commander.					
5960-188-8569	†	CRYSTAL UNIT, QUARTZ CR-18/U-----	ea	NX	1		V4
5960-188-3915	†	ELECTRON TUBE: MIL JAN type 2E26-----	ea	X	1		V3
		ELECTRON TUBE: MIL type JAN 5763-----	ea	X	1		

5960-262-1703	+	+	ELECTRON TUBE: MIL type JAN 5R4WGA-----	ea	X	1	V6
5960-188-3551	+	+	ELECTRON TUBE: MIL type JAN 6AK6-----	ea	X	1	V2
5960-262-0161	+	+	ELECTRON TUBE: MIL type JAN 6L6WGB-----	ea	X	2	V8 V9
5960-166-7663	+	+	ELECTRON TUBE: MIL type JAN 12AU7-----	ea	X	2	V1 V5
5960-166-7664	+	+	ELECTRON TUBE: MIL type JAN 12AX7-----	ea	X	1	V10
5960-262-0964	+	+	ELECTRON TUBE: MIL type JAN OA2WA-----	ea	X	1	V7
5920-228-7882	+	+	FUSE, CARTRIDGE: 2 amp, 250 v; ferrule term, glass body; 1¼ in. x ¼ in. dia; MIL-F-15160C type FO2D2ROOB.	ea	X	1	F1
5920-510-7611		+	FUSE, CARTRIDGE: 2 amp, 125 v; ¼ in. dia x 1¼ in. lg; Spec MIL-F-15160 type FO2D2ROOB.	ea	X	1	F1
6240-155-8706		+	LAMP, INDICATOR: 6-8 v, 15 amp; bayonet base; bulb T-3¼ clear; Mazda No. 47.	ea	X	2	DS1 DS2
6210-542-6354		+	LIGHT, INDICATOR: bayonet base; miniature, red jewel, type No. MS90285; LH50BR2.	ea	X	1	XDS2
5960-264-3004		+	SHIELD, ELECTRON TUBE: cyl shape, open top; 1½/6 in. lg x 1.050 in. dia; mts on socket fl; JAN type TS103U02.	ea	X	3	E4 E7 E9
5960-272-9094		+	SHIELD, ELECTRON TUBE: straight cyl, open top; 1¼ in. x 0.950 in; spring mtd; JAN type TS102U02.	ea	X	1	E5
5960-265-0573		+	SHIELD, ELECTRON TUBE: straight cyl w/flared end; 2⅝ in. lg x 0.978 in. dia; JAN type TS103U03.	ea	X	1	E6
5960-646-4617		+	SHIELD, ELECTRON TUBE: straight cyl, open top; 2⅝ in. lg x 1 in. dia o/a; black; International Electronic Corp part No. TR6 6025.	ea	X	1	E6
5960-295-7652		+	SHIELD, ELECTRON TUBE: JAN type TS102U03-----	ea	X	1	E8
RUNNING SPARES AND ACCESSORY ITEMS							
CONVERTER, TELEPHONE, SIGNAL CV 542/TRC-47							
5960-237-6917			ELECTRON TUBE: MIL type JAN 5725/6AS6W-----	ea	X	1	V1
5960-262-0167			ELECTRON TUBE: MIL type JAN 12AT7WA-----	ea	X	1	V2 V3 V5
5960-188-3551			ELECTRON TUBE: MIL type JAN 6AK6-----	ea	X	1	V4
5960-166-7648			ELECTRON TUBE: MIL type JAN OB2-----	ea	X	1	V6
5960-188-3564			ELECTRON TUBE: MIL type JAN OA2-----	ea	X	1	V7 V8
5960-188-0880			ELECTRON TUBE: MIL type JAN 6X4W-----	ea	X	1	V9 V10 V11
5920-636-3047			FUSE: 1 amp, 250 v; type No. MS90079 24-----	ea	X	5	F1
6240-155-8706			LAMP, INCANDESCENT: 6 to 8 v; min bayonet 2 term; clear, T-3¼; GE No. 47.	ea	X	1	DS1
6240-143-3063			LAMP, INCANDESCENT: 120 v, 6 w; clear; 1¼ in. max lg o/a; GE No. 686DC.	ea	X	1	RT1

(1) Federal or technical service stock No.	(2) Designation by model	(3) Description	(4) Unit of issue	(5) Expend- ability	(6) Quantity authorized	(7) Illustration	
						Figure No.	Item No.
5960-262-1357	†	RECEIVER RADIO R-748/TRC-47; R-748A/TRC-47 Model Column 1 refers to R-748/TRC-47; Column 2 refers to R-748A/TRC-47. ELECTRON TUBE: MIL type 5654/6AK5W-----	ea	X	2		V1 V2 V3 V4 V5
5960-262-0167	†	ELECTRON TUBE: MIL type 12AT7WA-----	ea	X	1		V6 V7
5960-264-2089	†	ELECTRON TUBE: MIL type 5749/6BA6W-----	ea	X	1		V8 V10
5960-228-3764	†	ELECTRON TUBE: MIL type 6J6W-----	ea	X	1		V9
5960-248-3089	†	ELECTRON TUBE: MIL type 6005/6AQ5W-----	ea	X	1		V11
5960-166-7664	†	ELECTRON TUBE: MIL type 12AX7-----	ea	X	1		V12 V13
5960-262-3763	†	ELECTRON TUBE: MIL type OB2WA-----	ea	X	1		V14
5960-188-0943	†	ELECTRON TUBE: MIL type JAN 6AX5GT-----	ea	X	1		F1
5920-636-3047	†	FUSE CARTRIDGE: 1 amp; 250 v slow acting; MIL FO2G1ROOB.	ea	X	5		DS1 DS2 DS3
6240-155-8706	†	LAMP, INCANDESCENT: miniature bayonet base; 6-8 v type No. 47 per Fed Spec No. W-L-116.	ea	X	2		DS1 DS2 DS3
6240-019-3146	†	LAMP, INDICATOR: 6-8 v, 15 amp; miniature screw base; T-3¼ clear; 1⅞ in. lg; Mazda No. 40.	ea	X	2	4	DS1 DS2 DS3
6210-500-4024	†	LIGHT, INDICATOR: accom min screw T-3¼ bulb; 1½ in. lg x ⅞ in. w x 1½ in. h; Drake Mfg No. 20S.	ea	X	2	4	XDS1A XDS2A XDS3A
		TRANSMITTER, RADIO T-593/TRC-47; T-593A/TRC-47					
5960-188-8569	1	Model Column 1 refers to T-593/TRC-47; Column 2 refers to T-593A/TRC-47. ELECTRON TUBE: MIL type JAN 2E26-----	ea	X	1		V4
5960-188-3915	†	ELECTRON TUBE: MIL type JAN 5763-----	ea	X	1		V3
5960-262-1703	†	ELECTRON TUBE: MIL type JAN 5R4WGA-----	ea	X	1		V6
5960-188-3551	†	ELECTRON TUBE: MIL type JAN 6AK6-----	ea	X	1		V2
5960-262-0161	†	ELECTRON TUBE: MIL type JAN 6L6WGB-----	ea	X	1		V8 V9
5960-166-7663	†	ELECTRON TUBE: MIL type JAN 12AU7-----	ea	X	1		V1 V5
5960-166-7664	†	ELECTRON TUBE: MIL type JAN 12AX7-----	ea	X	1		V10
5960-262-0964	†	ELECTRON TUBE: MIL type JAN OA2WA-----	ea	X	1		V7
5920-228-7882	†	FUSE, CARTRIDGE: 2 amp, 250 v; ferrule term, glass body; 1¼ in. x ¼ in. dia; MIL-F-15160C type FO2D2ROOB.	ea	X	5		F1
5920-510-7611	†	FUSE, CARTRIDGE: 2 amp, 125 v; ¼ in. dia x 1¼ in. lg; Spec MIL-F-15160 type FO2D2ROOB.	ea	X	5		F1
6240-155-8706	†	LAMP, INDICATOR: 6-8 v, 15 amp; bayonet base; bulb T-3¼ clear; Mazda No. 47.	ea	X	1		DS1 DS2

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

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Units org under fol TOE:
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11-16
11-57
11-127
11-128
11-500 (AA-AE)
11-557
11-587
11-592
11-597
44-145
44-147
44-445
44-447

NG: State AG; units—same as Active Army.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

